IN THE CLAIMS:

1 1. (Currently Amended) A method for partitioning a pattern into optimized sub-2 patterns, the method comprising: 3 providing a list of features of the pattern: 4 generating a set of candidate partitions using the list of features of the pattern: 5 scoring each candidate partition of the set of candidate partitions by building sub-6 patterns using the set of candidate partitions, wherein the scoring includes analyzing an 7 overall suitability of each sub-pattern; 8 determining a best-scoring partition among the set of candidate partitions; 9 applying the best-scoring partition to the list of features so as to provide a 10 plurality of sub-lists of features respectively representing a plurality of optimized sub-11 patterns. 1 2. (Original) The method of claim 1, wherein providing a list of features includes: 2 using at least one sub-list from the plurality of sub-lists of features generated by 3 an earlier application of the method as the list of features of the pattern. 1 3. (Original) The method of claim 1, wherein providing a list of features of the pattern 2 includes: 3 providing an image; and 4 extracting a list of features from the image. 1 4. (Original) The method of claim 3, wherein extracting a list of features from the 2 images includes: 3 sampling the image so as to provide a regular array of pixels. 1 The method of claim 3, wherein extracting a list of features from the 5. (Original) 2 images includes: 3 using an edge extraction method to provide an edge image; and

- 4 sampling the edge image to provide a plurality of edge feature points.
- 1 6. (Original) The method of claim 5, wherein each edge feature point includes the angle
- 2 of the edge at that edge feature point.
- 1 7. (Original) The method of claim 1, wherein features of the pattern are 2D image
- 2 points.
- 1 8. (Original) The method of claim 1, wherein features of the pattern are points of any
- 2 dimensionality.
- 1 9. (Original) The method of claim 1, wherein providing a list of features includes:
- 2 providing an abstract pattern description; and
- 3 extracting a list of features from the abstract pattern description.
- 1 10. (Original) The method of claim 1, wherein providing a list of features includes:
- 2 providing a pre-generated list of features.
- 1 11. (Original) The method of claim 1, wherein generating a set of candidate partitions
- 2 using the list of features of the pattern includes:
- 3 using a clustering algorithm.
- 1 12. (Original) The method of claim 1, wherein generating a set of candidate partitions
- 2 using the list of features of the pattern includes:
- 3 using a spatial subdivision algorithm.
- 1 13. (Original) The method of claim 1, wherein generating a set of candidate partitions
- 2 using the list of features of the pattern includes:
- 3 using a method that yields sub-lists that include pattern features that span an area
- 4 of the pattern that is spatially small with respect to the area of the entire pattern.

- 1 14. (Original) The method of claim 1, wherein generating a set of candidate partitions
- 2 using the list of features of the pattern includes:
- 3 using a method that provides sub-lists having pattern features that are more near
- to each other than to pattern features in other sub-lists.
- 1 15. (Original) The method of claim 1, wherein generating a set of candidate partitions
- 2 using the list of features of the pattern includes:
- building a weighted graph using the list of features of the pattern; and
- 4 partitioning the weighted graph to generate candidate partitions.
- 1 16. (Original) The method of claim 15, wherein building a weighted graph using the list
- 2 of features of the pattern includes:
- fully connecting the feature points to make a graph; and
- 4 setting the weights on each link.
- 1 17. (Original) The method of claim 15, wherein building a weighted graph using the list
- 2 of features of the pattern includes:
- 3 sparsely connecting the feature points to make a graph; and
- 4 setting the weights on each link.
- 1 18. (Original) The method of claim 16, wherein the weights on each link are based on
- 2 the distance between each pair of feature points.
- 1 19. (Original) The method of claim 18, wherein weights decrease as the distance
- 2 between feature points increases.
- 1 20. (Original) The method of claim 16, wherein the weights on each link are based on at
- 2 least one of similarity of angle and similarity of magnitude.
- 1 21. (Original) The method of claim 16, wherein the weights on each link are based on
- 2 values associated with the feature points of the pattern.

- 1 22. (Original) The method of claim 16, wherein the weights on each link are determined
- 2 such that:
- larger weights represent a pair of features that tend to be together in the same sub-
- 4 lists of features; and
- 5 smaller weights indicate a pair of features that can be included in different sub-
- 6 lists of features.
- 1 23. (Original) The method of claim 15, wherein partitioning the weighted graph to
- 2 generate candidate partitions includes:
- dividing the weighted graph into two sub-graphs, one of which may be empty;
- 4 and
- 5 converting the two sub-graphs into two sub-lists of features.
- 1 24. (Original) The method of claim 15, wherein partitioning the weighted graph to
- 2 generate candidate partitions includes:
- 3 partitioning the weighted graph using a "normalized cut" method to generate
- 4 candidate partitions.
- 1 25. (Original) The method of claim 1, wherein in generating a set of candidate partitions
- 2 using the list of features of the pattern, at least one candidate partition has only a single
- 3 sub-list of features of the pattern.
- 1 26. (Original) The method of claim 1, wherein in generating a set of candidate partitions
- 2 using the list of features of the pattern, each candidate partition has many sub-lists of
- 3 features of the pattern.
- 1 27. (Original) The method of claim 1, wherein in generating a set of candidate partitions
- 2 using the list of features of the pattern, some features included in the list of features of the
- 3 pattern do not appear on any sub-list of features of the pattern.

- 1 28. (Original) The method of claim 1, wherein in generating a set of candidate partitions
- 2 using the list of features of the pattern, at least one feature of the pattern appears on a
- 3 plurality of sub-lists of features of the pattern.
- 1 29. (Original) The method of claim 1, wherein scoring each partition of the set of
- 2 candidate partitions includes:
- 3 building sub-patterns using the set of candidate partitions; and
- 4 scoring each candidate partition using a scoring function based on characteristics
- 5 of a sub-pattern derived therefrom.
- 1 30. (Original) The method of claim 29, wherein characteristics of the sub-pattern
- 2 includes:
- 3 spatial coherence of the features corresponding to the sub-pattern.
- 1 31. (Original) The method of claim 29, wherein characteristics of the sub-pattern
- 2 includes:
- 3 overall spatial size of the area spanned by the feature points corresponding to the
- 4 sub-pattern.
- 1 32. (Original) The method of claim 31, wherein the area spanned by the feature points is
- 2 represented by the smallest bounding box that includes all the feature points.
- 1 33. (Original) The method of claim 29, wherein characteristics of the sub-pattern
- 2 includes:
- 3 the number of feature points in the sub-pattern.
- 1 34. (Original) The method of claim 29, wherein characteristics of the sub-pattern
- 2 includes:
- 3 the total amount of weight in links "cut" by the partition algorithm to create the
- 4 sub-pattern.

1 35. (Original) The method of claim 29, wherein characteristics of the sub-pattern 2 includes: 3 the overall "suitability" of the sub-pattern used as a search pattern applied to the 4 original pattern. 1 36. (Original) The method of claim 29, wherein characteristics of the sub-pattern 2 includes: 3 spatial coherence of the features corresponding to the sub-pattern; 4 overall spatial size of the area spanned by the feature points corresponding to the 5 sub-pattern; 6 the number of feature points in the sub-pattern; 7 the total amount of weight in links "cut" by the partition algorithm to create the 8 sub-pattern; and 9 the overall "suitability" of the sub-pattern used as a search pattern applied to the 10 original pattern. 1 37. (Original) The method of claim 35, wherein the overall "suitability" of the sub-2 pattern used as a search pattern applied to the original pattern depends on: 3 the search algorithm used. 1 38. (Original) The method of claim 35, wherein the overall "suitability" of the sub-2 pattern used as a search pattern applied to the original pattern depends on: 3 degeneracy of the features of a sub-pattern. 1 39. (Original) The method of claim 35, wherein the overall "suitability" of the sub-2 pattern used as a search pattern applied to the original pattern depends on: 3 redundancy of the sub-pattern within the original pattern. 1 40. (Original) The method of claim 1, wherein determining a best-scoring partition

among the set of candidate partitions includes:

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3	104119—0049 104119 using a partition score threshold.
1	41. (Original) The method of claim 40, wherein the partition score threshold is settable.
1 2	42. (Original) The method of claim 40, wherein the partition score threshold is predetermined.
1 2	43. (Original) The method of claim 40, wherein the partition score threshold includes a portion that is predetermined, and a portion that is settable.
1 2	44. (Original) The method of claim 40, wherein if no candidate partition has a score above the partition score threshold, then the list of features of the candidate partition is
3	deemed to be one that cannot be usefully sub-divided.
1 2 3 4 5 6 7	45. (Currently Amended) A method for automatically extracting a plurality of subpatterns from a pattern in an image, the method comprising: extracting a plurality of features; building a connected graph using the plurality of features; and using the connected graph and a sub-division parameter to create a plurality of feature groups, wherein the sub-division parameter includes an overall suitability of a sub-pattern.
1 2 3 4	46. (Currently Amended) A method for dividing a pattern into a plurality of sub-patterns, each sub-pattern being adapted for use with an image search method that can provide a plurality of sub-pattern search results, the method comprising: representing the pattern as a plurality of feature points;

scoring the candidate partitions by examining characteristics of each potential sub-pattern of each candidate partition, wherein the characteristics of each potential sub-pattern comprises a suitability of the sub-pattern used as a search pattern applied to the pattern;

generating candidate partitions of the plurality of feature points;

10 selecting the highest-scoring partition; applying it to the plurality of feature points so as to create one or more sub-11 12 pluralities of feature points. 1 47. (Original) The method of claim 46, wherein the sub-pluralities of feature points are 2 used as sub-patterns by an image search method that is adapted to use pluralities of 3 feature points. 1 48. (Original) The method of claim 46, wherein the characteristics of each potential 2 sub-pattern of each candidate partition include: 3 area, number of feature points, and suitability of the sub-pattern for use with a 4 particular search method.